[redacted]

SOKKIA™

AWS-1-2003-4

LEVEL BOOK

INDEX

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GC-NET AWS CHECKLIST	Site: CP1 4/19/03	mark
Field technician names	MC Jason, Ross, Matty	
problems on arrival?	4 broken SE-60 ✓	
Data	Download Data from Logger (datafile name)	✓
Aws4p103.dat	Backup data on zip disk or memory card	✓
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	✓
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
–	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)? 3 - 5	
2° north	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	✓
Site Survey	Ice in net radiometer domes on arrival yes	
115 cm	Wind1 axle height before and after maintenance	274
235 cm	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
40 cm	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation 40° west	
	Snow height 1 orientation	
	Snow height 2 orientation	
40 cm	Enclosure orientation + Night	
Aug 04	Guy wire orientations Removed	✓
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations? NO	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken 2 1/6"	
Final Platform Check	wiring	

Arrived at site at 1300 local time

West East

T/KM ① = 110 cm

T/KM ② = 230 cm

- The tower bent 1 guy wire, so was leaning to the SSW. approximately 3°
- New extension:
  - ① Require new temperature string 2005 for next extension
  - ② should bring new power cable in 2005
- tower orientation and other extension
- both anis instruments damaged, require new instruments

mag dec used = 40° W

rad orient = 180°

GC-NET AWS CHECKLIST	Site: Jar 1 4/26/03	mark
Field technician names	MC Jason Ken Molly	
problems on arrival?		
Data	Download Data from Logger (datafile name)	✓
	Backup data on zip disk or memory card	✓
	Upload new program (name)	x
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	x
	Ending Julian Day, Hour, and Minute:	x
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	✓
275cm	Wind1 axle height before and after maintenance	✓
395 cm	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	x
	Enclosure height before and after maintenance	x
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	x
	Snow height 2 orientation	x
	Enclosure orientation	x
	Guy wire orientations	x
	Instrument arms moved? (avoid this)	x
New Instruments	serial numbers and instrument type	✓
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

4/26 Jar 1 : Lower mast and clean drill GPS stake

- Δed datalogger due to technical at 2100, may not have data between 4/24 – 4/25
- Air temp flying out of no. 3 m not in ice
- mast drilled for Jar 1, tall 3.6 m in ice (12' mast)

	Bolt	Nut
Wind ①	275 cm	164 cm
T/RH ①	270 cm	166 cm

- have 120 cm separation between probe arm + instruments
- some ice in Q* domes, too high to determine whether station radiometers level
- very little ice in dome
- need to do domes on 2*, Done!

GC-NET AWS CHECKLIST	Site: JAR1 see alfa paper later	mark
Field technician names		
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	✓
	Upload new program (name)	
Transmitter	Reset/program transmitter	✓
Data Logger	How Much drift of Data logger time? 0	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	✓
Site Survey	Ice in net radiometer domes on arrival	✓
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data?	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

05/03

need to bring 1 sonic, taken to SMS2, plug style

awsjr1_03.dat

is right at 0m. 33 cm

wind - could use this at night to test to extrap

reset base 3.6 m in ice

GC-NET AWS CHECKLIST	Site: Swiss AWS camp	mark
Field technician names		
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

05/04

- changed dessicant and battery in pin
- re-attached upwind guy wire.
- see also notes following from 4/26.
-

GC-NET AWS CHECKLIST	Site: DYE 2 05/09 19308	mark
Field technician names	J.B., E.P., A.M.	
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time? none	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

- sonic 1 has moved. may be problem for sonic 2
- propeller 1 nw nut missing
- heights TH1 124 cm
  W1 121 cm

SADDLE!

after

W1	103 cm
TH1	87 cm
TH2	204
W2	207

sonic height 1 increased.

GC-NET AWS CHECKLIST	Site: SADDLE	mark
Field technician names		
problems on arrival?		
Data	Download Data from Logger (data file name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time? none	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS? yes	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data yes	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

wind T

Z1 = 59 59

Z2 = 178 177

sonic 1 5 cm

2 148 cm.

see heights after on DYE-2 page

used piece at SDM-S

no extension, will be partially buried in '04

net domes replaced. much ice inside.

SMS5 cont.

the surface undulations are roughly 70 cm in height ~ 50 cm amp.

after lowering:

161 cm Wind

156 cm T/H

swapped out data logger

depart 20:30 Z

we lowered but did not re-drill the base.

SMS1 CR10 / sn 192

who JB, NC, MM, RH

tower was level instr z 390 cm

collect all from storage module @ 1200 baud!

re drilling base, insert 9.2m in ice!

instr z after = 167 T/H
137 Wind

tower is now leaning ~ SSW ~3-4° !

will need to monitor tower mast, because it is leaning may consider replacing mast even though drilled 9.2 m in ice

JAR1 Download v:5/4

01:30 AM Z 4/28

AWS working, just
not transmitting,
clock is off.

The glacier is cracking
each few seconds!...!
talking.

The lower $\frac{1}{2}$ of mast is
~~5 field books or pass~~
* 64m, leaving only
2.~~6~~ m in ice.
2

The old mast cabled
along side will be
dangeling before end
of melt season.

JAR1 cont.

Downloaded data
aws_jr103.dat
* cleared memory.
* A76A*6A

reset transmitters
clock drift interrupt
ed the xmit.

04/25

return to site 16:45
begin chipping out old mast
" steam drilling new "

05/01 sms cal

JAR2. mounted on Revel 1 2042z so, 22z should be first good cal value. pg. clocks synced!

05/02

end sms cal using 1200z sms 3

, HMP not working. time on site = 3h, but failed getting data trying to diagnose HMP, abort sms calibration. very sorry todd, I tried hard.

sms 3, 05/02

- reinstall base 5.9 m in ice
- humocky surface
- collected 1act 128h of data to sm3-03b.dat
- swapped cr10x 2mb for smart 5 cr10x without extended memory but with sm716 storage module.
- roughest ice just above sm3.

Swiss camp fuel: inventory

- camping stove gallons III
- full Jerry cans IIII II
- 2 x ½ full small propane gas with old push-on regulator.
- kg gas bottles IIII II in (2) use

SWC Alu inventory.

JAR 2 or 3 extension piece 1
" " sleve III
smart stake extension 4.5 m
" " sleve III

SWC misc. inventory

4 x AC extension cords
1 x 100' sent back to CU
11 shovels
3 x Scott tents.

Return shipment
incl broken instruments.

Box 4. kg Zarsco

- kg wind turbine.
- 21 x x 2, kg drill bits, for wood
- " battery x 3
- 100' AC extension cable.
- 2 x 10 W old solar panel
- misc electr. parts, wind turbine?
- Trimble 4000 (broken?)
- sm 716 w/ sms cal data
- propane torch
- sc 532 A
- HMP 45 (broken?)
- TC used in sms cal
- Magellan parts
- CR10 keypad (broken?)
- CR10X broken?
- SC32b + 9pin cable
- rad modem cable + modems.
- 4 x broken sonic height.
- TGT 1 Goes transmitter, broken?

Box 2. kg Zarges

S. Travers spare parts.

2002 - 2003 major problems.

AWS/SMS

- DYE-2 Table 2 unactivated ?
- SMS 2 melted out, leaned 45°
- propellors off at SADDLE and DYE-2
- propellor broken @ JAR2 during maintenance
- multiplexer replaced @ DYE
- keypad + CR10x shorted @ JAR1, replaced. Jason's fault?
- ADG membrane delamination 2x GPI, 1x DYE2, (x SDOME 1x SMS2,

2004

(Instruments + Extensions)

- saddle = extension = pwr cable extension do not need new TC string
- NASA - SE = extension + TC string redrill
- S Dome - extension
  - sw incoming
  - multiplexer?
  - ADG
  - new TC string
- Swiss Camp - 1.350 VDC PIR battery
- DYE-2
  - ADG x1, x2?
  - JAR1 - GPS progr cable
  - ADG x1
  - GPI
  - ADG x1
  - JAR2 - GPS progr cable
  - propellor
  - 2 non styrofoam wind sensors?

(p1 of 2) 2004 recommendations

- measure grain size @ pits.
- bring 4x new ADG to increase number to 2 @ AWS sites mentioned on prev. page, plus at least 4 more in anticipation of future, i.e. 2003 failures.
- Do AWS extensions + servicing as pit stops rather than camping, = ½ flight hours. If you have 4-5 helpers, can reduce ground time to less than 3h!
- get longer winch for tripod and consider leg extensions and a faster method to join pieces.

2005 instruments

new TC strings or extension required @ CP1

(p2)

More 2004 recommendations

- more crevasse rescue training. i.e. "self rescue" - roping person-person in v. rough spots!
- earlier Twin Otter reservation so not require expensive Ken Borek, at least use tentative dates as place holder.
- employ Kim Petersen again, perhaps @ Swiss Camp + JAR.

steam Drilling 2004.

SMS # 5?, 3

AWS JAR2
JAR1? probably
JAR3

SMS not requiring re-drill
SMS1, but 2-3° leaning
SMS2, 7.0 m 2003
(9.2 m in 2003)

see ALD inventory in
this book, have pieces
for some of this work

JAR3?

Molly + Kim

SMS 4
JAR 3

overhead

air alpha

steam drill box

8-9K

no small fitting.

Air Alpha
Greenland Air

Greenland Air
Ilullisat flt.   JAV

20 maj   8:30 AM
22 " "   12:35 PM

4314 Dkr $639!
8628 Dkr Total
Res # Y74 CVV

Air Alpha   JAV - SWC - JAR3
$3683   Swiss camp incl airport.
265 Dkr.
1000 Dkr tax / flt.
14575 cost sans opening

* est JAR3 33,800 Dkr
$5000

5/30 Tunu-N   1930 Z
Koni & Russ

153 cm to Arm Bottom (lower)
-29 from Bottom Arm to TC
Station Clock is 8 minutes fast
Channel 2 Surface height (upper) is out.
Thermistor chan. 1 - fine but a bunch of outliers
Therm channel 2 - many outliers but good now
3-6 good
7,8 have holes - questionable
9,10 Good; near Surface
* Lower Arm Raised
Arm Separation is now 87.5 cm
Lower Arm is 205 cm above the
Instruments are 25 cm above Arm
=> Lower Instruments are 230 cm
above Surface
Replace Radiation Shield

5/31 Tamm Snowpit by Russ Huff

0-23 cm: New snow layer, very homogeneous

23-29 cm: weak wind layer over heavily morphed hoar

29-48 cm: Soft homogeneous hoar with round crystal struct

49-50 cm: heavily morphed snow, almost ice w/ large air gaps of over 1cm in height. Crystals are regrowing in the air gaps

50-61 cm: This is the melt layer w 3-4 ice horizons:

.2 cm ice horizon at 54 cm

-57 cm: 2 cm thick ice

-60 cm: .2 cm ice horizon

61-83 cm: large crystal (rounded) and homogenous.

83 cm: 2-5 cm thick ice lense

This is the 2001 horizon

116 cm: 1 cm thick dense small layer that could be the 2002 melt horizon

Snow density

multi-trim cylindrical density kit w/a 0.5 L syringe volume

	multi.	Temp
0	190 g	-15.9° C
10	200 g	-18.4°
20	180	-18.7
30	130	-20.9
40	150	-22.0
50	180	-22.7
60	175	-23.7
70	210	-25.1
80	130	-24.8
90	170	-25.1
100	200	-25.8
110	150	-27.4
120	200	-27.9

Radar Experiment r/s

Using 1 Ghz

Sweeping at 24,000 MHz

=) Looking at top 3m

100m

12m

10m

100m

5mW

pt

100 x 100 m Area

Gridded every 10 m

*note: There is not enough baffler cable + Thermistor cable for 100m extension.

Snowpit SADDLE Stratigraphy

0–105	Continuous pencil hard
105–110	ice layer
110–114	fairly soft
114–116	continuous pencil hard
116–120	ice layer

SADDLE 18:00

Depth (cm)	Hardness (Finger Hardness)	Density	Snow Pit Temp °C
0	1F-4F	191	-19.5
0–10		294	-22
10–20			
30		304	-21
40		295	-21
50		296	-20
60		299	-20
70		279	-20
80		294	-20
90		316	-20
100		312	-21
	ice layer		
120		259	-21
	Large ice crystals (1-1.5 mm)	296	-21
140		311	-21
	ice layer		
160			

5/9/13

DYE 2

Molly McAllister
Kim Peterson

Depth (cm)	Density (kg/m³)		Temp (°C)
1-10	373		-16
10-20	329		-17
30	371		-18
40	303		-17
50	303		-17
60	386	w/ice	-18
70	389		-18
79-89	371		-18
89-99 (ICE)			
99-109	457	w/ice	-19

5/9/13 20:02

DYE 2 Strat

[illegible]

cm	
0-26	Wind packed
26-29	hard layer (pencil hard)
	Big wind event?
31-38	Sugar ≈ ½ mm grains
38-45	Sugar (One knuckle hard)
	↳ Warm period possible melt? late summer? ≈ 1 mm grains
45-50	1½-2 mm grain
50-51	1 cm ice layer (late summer melt)
55	melt event
60-70	10 cm of melt complex (refrozen slush)
71-78	Thick ice layer
83-81	2 cm ice layer
89-99	10 cm Monster melt layer

05/09 2003
1400Z

S Dome — Kim Peterson + [illegible]

depth (cm)	density kg/m³	Temp °C
0 - 10	331	-22
10 - 20	371	-23
30	405	-22
40	379	-23
50	394	-22
60	368	-22
70	371	-22
80	430	-23
	44?	-23
100	420	-23
	431	-23
120	457	-22
	439	-23
140	432	-22
	410	-24
160	424	-24
	434	-24
180	441	-24

All wind pack →

strat on reverse

Crawford Pt 4/18/03

19:45 Zulu

	Density			Hardness	cm
-15° C					
				3 Knuck	0 – 10
-16° C	180 g		Soft	1 Knuck	10
-17° C	160			1 Knuck	10 – 20
-17	135			Pencil	10
-18°	147	40	1 cm Ice Lense	finger tip	40
-19°	160			3 knuckle	40
-19°	110			finger tip	60
	155	62	1 cm Ice Lense	2 knuckle	70
	165			3 knuckle	80
	176		8 cm of Melt	finger tip	90

Crawford Point measurements:

- 40 cm accumulation over 12 months, here less than mean 132 cm

Two significant ice lenses 1-2 cm thick at 40 cm + 62 cm. Bottom annual Boundary has 8-10 cm of frozen slush over a solid ice layer.

GC-NET AWS CHECKLIST	Site: Petermann Glacier 5/6	mark
Field technician names	Ken, Mic + KWS	
problems on arrival?		
Data	Download Data from Logger (datafile name)	✓
	Backup data on zip disk or memory card	✓
	Upload new program (name)	✓
Transmitter	Reset/program transmitter	✓
Data Logger	How Much drift of Data logger time? 4 mins	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	✓
129 cm ± 77 cm	Wind1 axle height before and after maintenance	
309 cm ± 5 cm	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	x
	Enclosure height before and after maintenance	✓
	pieces	
	Profile Arm Orientation	x
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
#s	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
33 m	Position of Site: 80°40'32 N 60°15'20 W	
	Elevation of Site: 25 m	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
[illegible]	Mast Extension notes, time taken	
Final Platform Check	wiring	

5/6 1430 Clear - calm conditions

Note has a depression (ring) around the base. may have more surface melt eroded than expected, about 25 cm

- hard looking in both Q* domes
- 4 minutes fast on station Δ and clock during data collection

	Before	After	
① T/RH	168 cm	② 193 cm	② 62 cm	(17 cm)
② Wind	① 187 cm	① 314 cm	① 77 cm	(4 cm)

↓ need to add

- 129 cm separation between profile arms
- snow depth under sensors 4-14 cm
- marked instruments down approx 105 cm
- started calibration at 1600 UTC. Last good 1700 UTC, with instruments at 203 cm (May 6, 2003)
- Crashed calibration at 1540 UTC on May 10 2003

GC-NET AWS CHECKLIST	Site: Kitsissorut Station cont.	mark
Field technician names		
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site: 60°40'32N 60152Q W	
	Elevation of Site: 25 m	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

5/11 1830

- temps ① out, looked at wires - secured on base, appears to be on again at 1634
- checked wind sensors:
  - ① Have vane with compass, W=E, so have ε (N, W, S) wind is 220° it is actually 140°, need to do: 360°-x = WD
  - ① Vanes not in line, - both appear to be 10° to W, thus having 190°S
- Δ[cd] domes at 1820-1840 (5/11), some looking frosty, with polycarbs shaded / not clear
- SW↑: 0° level, SW↓ assumed level.
- tc (temp string) 2 is 26 cm above snow. 32 cm above ice, thus tc3 is 68 cm in ice!

GC-NET AWS CHECKLIST	Site: SMS. Akermanv	mark
Field technician names	Tom, Nic + Russ	
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	✓
	Upload new program (name)	✓
Transmitter	Reset/program transmitter	✓
Data Logger	How Much drift of Data logger time? 19 mins	✓
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
level SW + 0°	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	✓
Site Survey	Ice in net radiometer domes on arrival	✓
	Wind1 axle height before and after maintenance	✓
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	✓
	Enclosure orientation + height 164 cm	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

7/5 Arrival at 14/14 UTC

- Data collection

Weights

	Total	Other
① T/RH	= 278 cm	133 cm
② Wind	= 278 cm	

- arm is 248 cm

- snow heights in domes on arrival (lower ring)

- about 9 cm snow under surface height

- 19 minutes slow, Δ ed

Instruments are 30 cm above X arm

New arm height is 79 cm (wind 1)

⇒ new profile height = 1.09 m

- enclosure heights 164 (before) - 32 (after)

- some difference in height between RH + wind

due to ice thermometer, need to take into account

- 58 cm between T/RH + sonic 1 bolts

- 75 cm height on sonic 1

GC-NET AWS CHECKLIST	Site: Humboldt 5/27/03	mark
Field technician names	Nic Koni Russ Craig	
problems on arrival?	-	
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	✓
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	✓
	Ending Julian Day, Hour, and Minute:	✓
	Weather conditions during calibration	✓
Radiometers	Tilting angles (elev/and azimuth)?	✓
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	✓
Site Survey	Ice in net radiometer domes on arrival	✓
[illegible]	Wind1 axle height before and after maintenance	✓
[illegible]	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	✓
	Enclosure height before and after maintenance	✓
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	✓
	Snow height 2 orientation	✓
	Enclosure orientation	✓
	Guy wire orientations	✓
	Instrument arms moved? (avoid this)	✓
New Instruments	serial numbers and instrument type	✓
GPS	GPS on AWS?	✓
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	✓
	Elevation of Site:	✓
	Seal Enclosure ports	✓
	Synoptic Observations?	✓
Need new str. in 2005	Temperature string info	✓
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

Humboldt 5/27/03

- Station buried except for top profile arm, had excavated deep in snow (approx 2 m)

① TRH ② = 110 cm

② Wind ② = 115 cm

↓ radiometers arm + 2 [illegible] buried

Logger is 6 min. slow

Year is off - 2009

262 cm from Surface to lower Arm

39 cm from Arm to Instrument

- 301 cm wind TRH ① after extension
- need profile information to calculate height of TRH ② and wind ②
- Notes:

① Cut arms (mast) and used two sleeves to extend tower, have multiple years of height

② Extended power cables by 10 m, have cable for next extension

③ Will require new temperature string in 2005

GC-NET AWS CHECKLIST	Site: Humboldt 5/27/03	mark
Field technician names		
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
e Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

Humboldt continued:

① Have 1 power loop others failure, linked power for solar panels, transmitter + datalogger

⑤ 1 HMP 45c not working, all tc working, have ice + snow in radiation shield - Top pyranometer, most melted off SWd

⑥ Radiation instruments need buried on arrival, with ice in domes

Required for next visit

① Consider new mounting bracket for enclosure, now only attached at bottom with cable

② HMP 45 c

③ Temperature string (2005)

④ Power cable + possibly new batteries & not transmitting

GC-NET AWS CHECKLIST	Site: Summit 6/1/03	mark
Field technician names	Kate Nic Russ	
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
NR. 638	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	✓
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
24 cm	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	✓
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	✓
[illegible]	Temperature string info	✓
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	

Summit General notes

Heights ① T101 @ 156 cm

② Wind @ 153 cm Wind @ 271

- lower signals extension, w/ most instruments up
- 107 cm to probe arms
- 120 cm separation between probe arms
- short cable for power + temperature string
- datalogger time reset
- wind 2 44 cm above arms
- General notes

① Wind ① missing bolt (bottom) needs replacing

GC-NET AWS CHECKLIST	Site: Naoa E	mark
Field technician names	Nic + Craig	
problems on arrival?		
Data	Download Data from Logger (datafile name)	✓
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time? slow 44 s	✓
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute: 150 2230	
	Ending Julian Day, Hour, and Minute: 151 2000	
clear, windy 7 m s⁻¹	Weather conditions during calibration	✓
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	✓
	Replace Net Radiometer Dome and Desiccant	✓
Site Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
190 cm	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	x
	Snow height 1 orientation	x
	Snow height 2 orientation	x
	Enclosure orientation	x
Removed	Guy wire orientations	✓
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	x
	Position of Site: 75 00 03 N 1959'41" W	
	Elevation of Site: 2606 m	
	Seal Enclosure ports	
	Synoptic Observations?	x
New for next visit	Temperature string info Need new string	
	Level surf. By mast? Fill?	✓
	Local topog. slope?	✓
In the book	Snow Pit Densities, who has the data	✓
	Mast Extension notes, time taken	x
Final Platform Check	wiring	

Naoa E : May 30 2003

① Datalogger time slow : 1 hour + 6½ minutes

② Collected data (564060) values at 1940,
2 years of data 159 1500 - 150 1800

③ Δ^cd time on datalogger at 507 (2007 UTC)

Heights: T/RH ① T/RH ②

① T/RH ① 227 cm ① 230 cm ② 370 cm

② Wind ① 227 cm - ① 230 cm
Wind - ② 374 cm

- 140 cm separation between probe height 1 + 2
- set up calibrations at 1030 UTC (2230)
- Time first data point 0 UTC
- calibrations of T/RH ① + ② at 227 cm,
wind ① + ② at 367 cm

Hints:

① Need new temperature string for next visit

② Will need to extend power cables

GC-NET AWS CHECKLIST	Site: Nasa E continued	mark
Field technician names	Nic + Craig	
problems on arrival?		
Data		
	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
level on arrival	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	✓
Site Survey	Ice in net radiometer domes on arrival	✓
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

- great calibration conditions, winds approx 7 ms⁻¹,
clear skies + -17°C at 0 UTC JD 151

③ lost power at 59 2002 - 120 1700 2003,
approx 60 days when power was down
④ melt occurred in 2002, on JD 179, 180 + 183,
also 192 June 28-29 and July 2 2002
⑤ more precipitation + warmer in 02-03 compared
to 01-02
Precipitation 01-02 10-30 cm → 40 cm
Precipitation 02-03 50 cm approx
④ Power off at 1700 UTC May 31 (JD 151) +
connected power transmitter + solar to small
lap, didn't load program, have CR10
with extended 2 MB memory
⑤ Δ ed domes, had dome (lower) that was
pushed in, with frosting on both
⑥ Ended calibration at 2000 UTC, JD151
went for 20 hours between 0-2000 on JD151
⑦ Collected all data thru JD 152 0000 UTC
⑧ Position: 75°00'03" N 29°59'43" W [illegible]

GC-NET AWS CHECKLIST	Site: Naaa U 6/1/03	mark
Field technician names	Rena, Russ, Craig, Jaskia, Nicolas	
problems on arrival?	No data, No programs	
Data No data	Download Data from Logger (datafile name)	
–	Backup data on zip disk or memory card	
New programs	Upload new program (name)	
Transmitter	Reset/program transmitter	✓
Data Logger	How Much drift of Data logger time?	–
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
No calibration	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
adiometers	Tilting angles (elev/and azimuth)?	–
eveled	Level Radiometers	✓
eplaced with	Replace Net Radiometer Dome and Desiccant	✓
te Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
122 cm	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

Naaa U · June 1-2, 2003

① Enclosure buried with lower probe beneath the surface

Wind ① 122 cm

T/RH ② 118 cm

After extension

① Profile arm above surface 232 cm

① T/RH ① 263 cm - 31 cm above arm

② Wind ① 263 cm - " "

① Profile arm separation = 142 cm

T/RH ① + Wind ② 33 cm above arm 2 - 175 cm separation

Notes:

① No data or programs on datalogger program, thus had to modify programs

② Replaced 2 × CS500 with 2 × HMP45C

③ Switched old pressure sensor with PTB101B

④ Will need power cable extensions (have some extra) and temperature string at next visit

GC-NET AWS CHECKLIST	Site: Nasa U continued	mark
Field technician names		
problems on arrival?		
Data	Download Data from Logger (datafile name)	
	Backup data on zip disk or memory card	
	Upload new program (name)	
Transmitter	Reset/program transmitter	
Data Logger	How Much drift of Data logger time?	
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	
	Ending Julian Day, Hour, and Minute:	
	Weather conditions during calibration	
Radiometers	Tilting angles (elev/and azimuth)?	
	Level Radiometers	
	Replace Net Radiometer Dome and Desiccant	
Site Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	

⑤ Fumical Sensor SN: T4520024 (PTB1018)

⑥ CR10 with 2MB extended memory datalogger with SM 716 storage module

⑦ Argos 11181 (10), System No: 372327

GC-NET AWS CHECKLIST	Site: Jar 3 , Jun 3	mark
Field technician names	[illegible], Alic + Russ	
problems on arrival?	[illegible] !! 1130 arrival	
Data	Download Data from Logger (datafile name)	✓
	Backup data on zip disk or memory card	✓
	Upload new program (name)	x
Transmitter	Reset/program transmitter	x
Data Logger	How Much drift of Data logger time? 85 seconds	fast
Profile Instr. Calibration	Starting Julian Day, Hour, and Minute:	✓
	Ending Julian Day, Hour, and Minute:	-
	Weather conditions during calibration	-
Radiometers	Tilting angles (elev/and azimuth)?	✓
	Level Radiometers	✓
	Replace Net Radiometer Dome and Desiccant	✓
Site Survey	Ice in net radiometer domes on arrival	
	Wind1 axle height before and after maintenance	
	Wind2 axle height before and after maintenance	
	maintenance	
	maintenance	
	Radiometer height before and after maintenance	
	Enclosure height before and after maintenance	
	pieces	
	Profile Arm Orientation	
	Snow height 1 orientation	
	Snow height 2 orientation	
	Enclosure orientation	
	Guy wire orientations	
	Instrument arms moved? (avoid this)	
New Instruments	serial numbers and instrument type	
GPS	GPS on AWS?	
Differential GPS meas.?	datafile and GPS instrument	
	Position of Site:	
	Elevation of Site:	
	Seal Enclosure ports	
	Synoptic Observations?	
	Temperature string info	
	Level surf. By mast? Fill?	
	Local topog. slope?	
	Snow Pit Densities, who has the data	
	Mast Extension notes, time taken	
Final Platform Check	wiring	

Jar 3 : Ablation Zone

① 1 minute 25 seconds too fast (datalogger)

② Heights ① T/KH ① 365 cm

② Wind ① 365 cm

③ Collected all data, [illegible] programs, new time

④ Cut old mast, took down to Boulder - Kanger

⑤ Only have 1 bolt in each end of extension, mast in approx 5 m

Heights : after lowering

① Arm (profile 1) = 48 cm

Wind ① = 84

T/KH ① = 82

② Bar seperation = 127 cm

T/KH ② = 39 cm above arm 2

③ Wind sensors oriented south using declination 40° W, have lost orientation

After extensions, assuming 40° W

1. Tower not quite level, 2-3° to East
2. Δ^ed domes: previous domes just shaded, no ice in them

Notes:

1. Enclosure damaged during lowering, need new enclosure or alternative to strengthen, just attached at bottom
2. Need temp. string
3. New Q* would be useful, old is damaged + taped only

4. Strapped tower enclosure with straps + rope
5. Levelled SW↓ + Q*, assume SW↑ is level

Final comment:

1. Water running in rivers near station
2. Huge volume of water in old moat, rapid melt

June 4 2003 : Scoresbysund fjord

① Haul crane + tripod yellow box with all equipment (now the green box)

① 2 carabiners
② cable × 3
③ crane bolt
④ Rope × 3
⑤ Cargo straps
⑥ Crane plate + accessories
⑦ SMS sleeve

In storage

① Tripod
✓ ② 1 × summit extension without sleeve
✓ ③ 1 × SMS extension with sleeve
✓ ④ 1 × SMS sleeve (in green box)
✓ ⑤ 1 × JMK 2 (3 inch mast) extension
✓ ⑥ 1 × SMS lower piece (small box section)

continued next page

Radiosonde : June 4 2003

① haul balloons × 38
② radiosonde × 35
③ 7 balloons per gas bottle

④ 20 m cable from box to antenna

SMS ④ : Notes : Station SMS ④

① Height = 3.72 m plus small junction
= 1.07 to junction place + bolt mast

· didn't measure heights or take photo of station
· have other heights, 1.07 from junction to profile arm. Thus have heights from there
· removed June 6 2003

✓ ① Jur 3 inch masts × 3 + 1 sheet
✓ ② 4 bolts, extension rods with sheet
✓ ③ thin wall GPS poles × 20 3.1 m
✓ ④ 5 portable arms (and bolts + pieces) - 5.10
✓ ⑤ 1 3 inch Jur 3 mast sheet
⑥ 1 special table

⑧ batteries 24 × 18 amp hr
⑨ Kleen drills × 2
⑩ label rolls × 46
⑥ Forms, taped together
⑪ canvas wsseal × 2

Pleumont : May 9, 2004 JD 130

Very little snow accumulation

Surface heights:

Q'	282 cm	
Arm height ①	173 cm	125 cm - between 1 + 2
Wind ①	203 cm	
KII/T ①	184 cm	
Wind ②	328 cm	} check these numbers
KII/T ②	309 cm	
Junction	~ 70 cm	
Enclosure	177 cm	
SW	290 cm	

Snow depth Sonic ① 18 cm (East)
Sonic ② 3 cm (West)

Surface - T 295 cm

Snow height ~26 cm Arm ②

Comment · had a mote around the tower, perhaps met surface lowering

· 4 minutes too late on station, had drift over winter
· need to account for this, Δ of time 1508

Location 80° 41' 00 N   24 m
60° 17' 53 W

Height = 24 m above the surface
= 25 m on GPS waypoint

Snow variable, between about 3-20 cm.
ones melted on very little

· Thermocouple of ice string 3 in 69 cm above surface
· 69 cm above ice (to 3)

snow depth at the AWS

Distance from AWS	N west	S west	N east	
5	2 cm	2 cm	2 cm	21 cm
10	5 cm	13 GPS	1	2
15	4	20	2	2
20	9	5	2	1.5
25	3	17	15	3
30	1	12	2	1.5
35	2	14	14	1
40	11	2	2	1.5
45	4	2	10	4
50	3	2	2.5	15

GPS pole height Above snow 63 cm

1900 UTC · arrived on site to check the load, changed Q° domes
· finished about 1945
· load ringed

- note Kilometer? AWS [illegible]

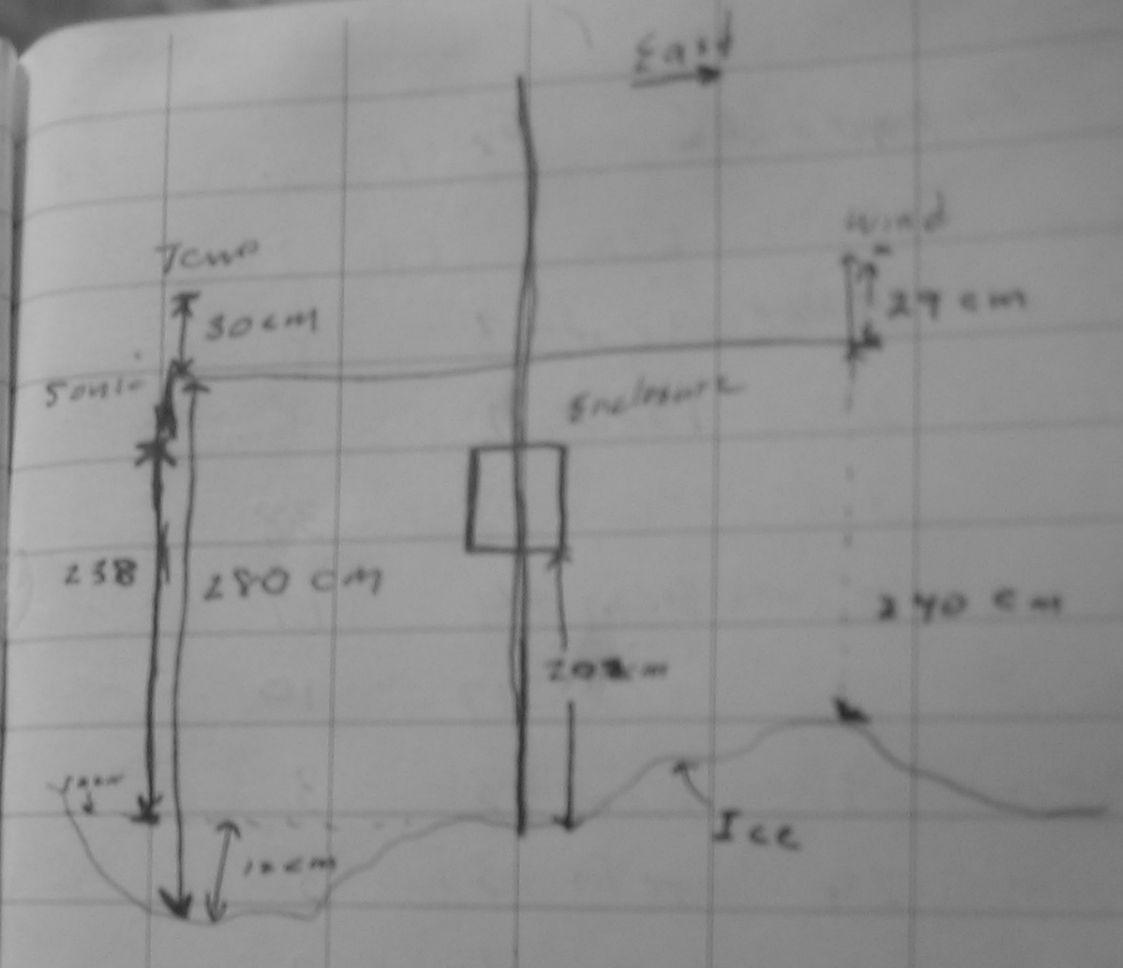
Petermann SMS 5/14/04 15:00 GMT

Location: 80°36 12 N
60°03 13 W

Elevation is 54 m

Sonic is about an L ship mate
Snow depth directly below Sonic = 12 cm
(26 cm to Instrument)
Ice to Arm Below wind is 240 cm
note: Sonic is 4 below the Temp (TEMP) arm
Ice to Arm 280 cm (310 to temp sensor)

Snow to Sonic 238 ± 1 cm
Ice to Bottom of Hull
Ice to Radiation 274 cm



clock is 30 s fast
Lower Radiation dome has some frost

Snow Depth

	N	S	East	W
5 m	3 cm	2 cm	2 cm	2 cm
10 m	3	3 cm	3	8
15 m	2	13 cm	2	4
20 m	3	18 cm	18	38
25 m	2	3 cm	4	17
30 m	3	3 cm	17	10
35 m	9	2 cm	3	3
40 m	29	5	3	3
45 m	2	11 cm	10	2
50 m	2	20	10	4

2-3 cm skiff of snow w/drifting between

sastrugi humps.

Depths are taken along 4 lines Radiating

from the pole outward at every 5 m.

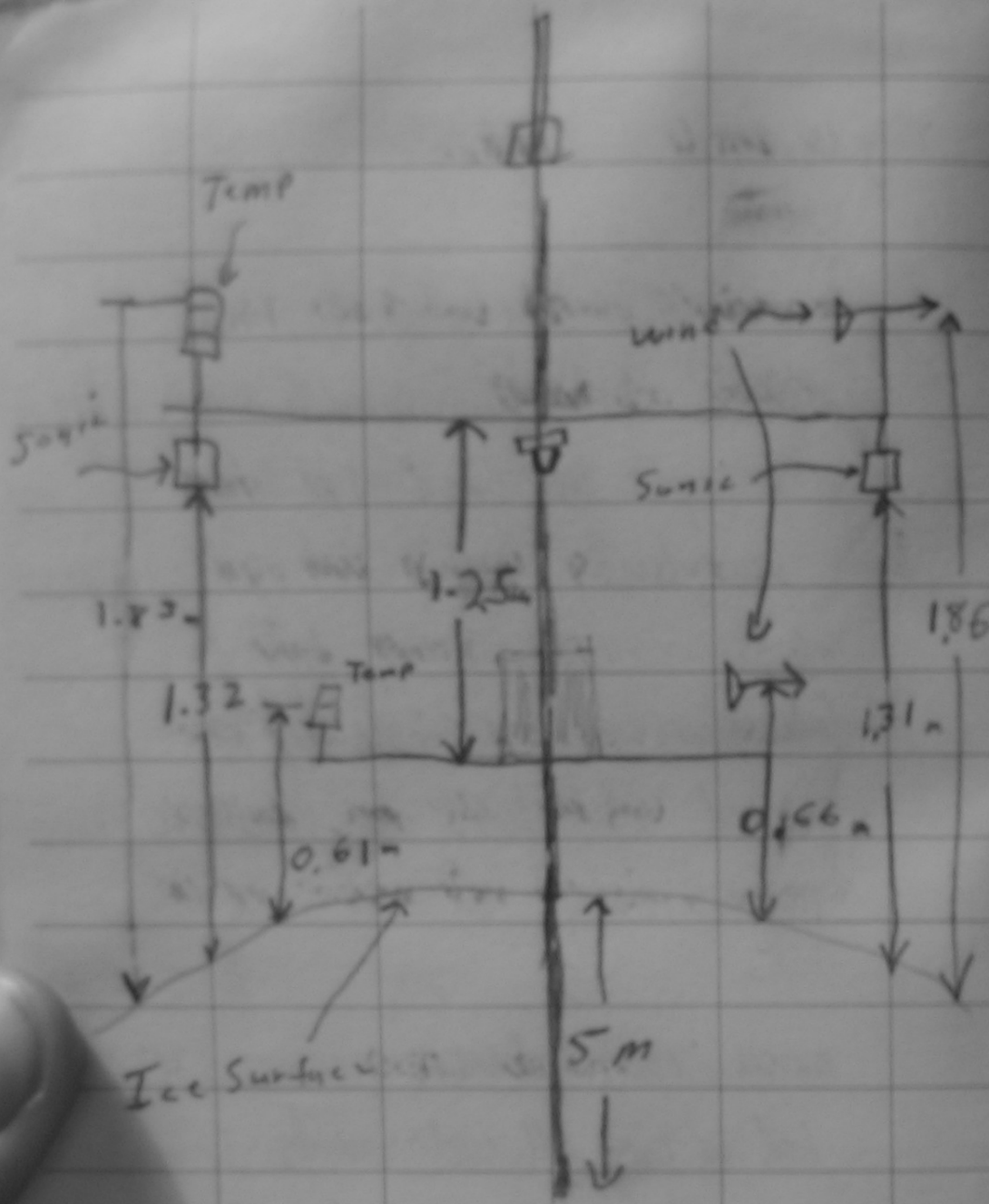
in the cardinal directions.

May 15, 2004 : Petermann AWS

- moved AWS into calibration mode
- started 2219 UTC. moved wind to upper level and T/RH to lower level

① Calibration 2219 UTC started.
ended calibration at 1100 UTC,
May 16, 2004

- moved station between 1100-2135 UTC, had to move all instruments to new tower
- used magnetic declination of 62°



Skin Temp Sensor 1.70 m

Net Radiation : 1.85 m

Original Pole is 87 cm above Ice

Thermistor String: #3 thermister is

May 24, 2004 JAR2

- departed Swiss Camp at 1015, about 3½ hours
- attempt to download failed when ladder supporting laptop tell over
- laptop connected to new but appeared to fail because of act snow
- started drilling at 230 pm, drilled 10 holes that all hot water up to 700 pm
- finished drilling at 2130

Tower: leaning 16° towards ice sheet

Heights Lower Arm 396 cm

WI 433 (+37) T/RH 433 (+37)

Distance between arms 196 cm

h = 36.5 cm [illegible] 36 above arm 2

Sonic is 26 cm below arm 2

- next point at 0100
- stuff required:

① Solder for batteries

② [illegible] connections

③ Boxes

④ [illegible]

⑤ 2 new sensors

- drilled 5.7 m into ice ~6 m
- redrilled + installed

May 26, 2004   Arrived at 1330 (local)

- started data collection
- had time offset since lost power on May 24, 2004

PC time: 15:50:00 GMT

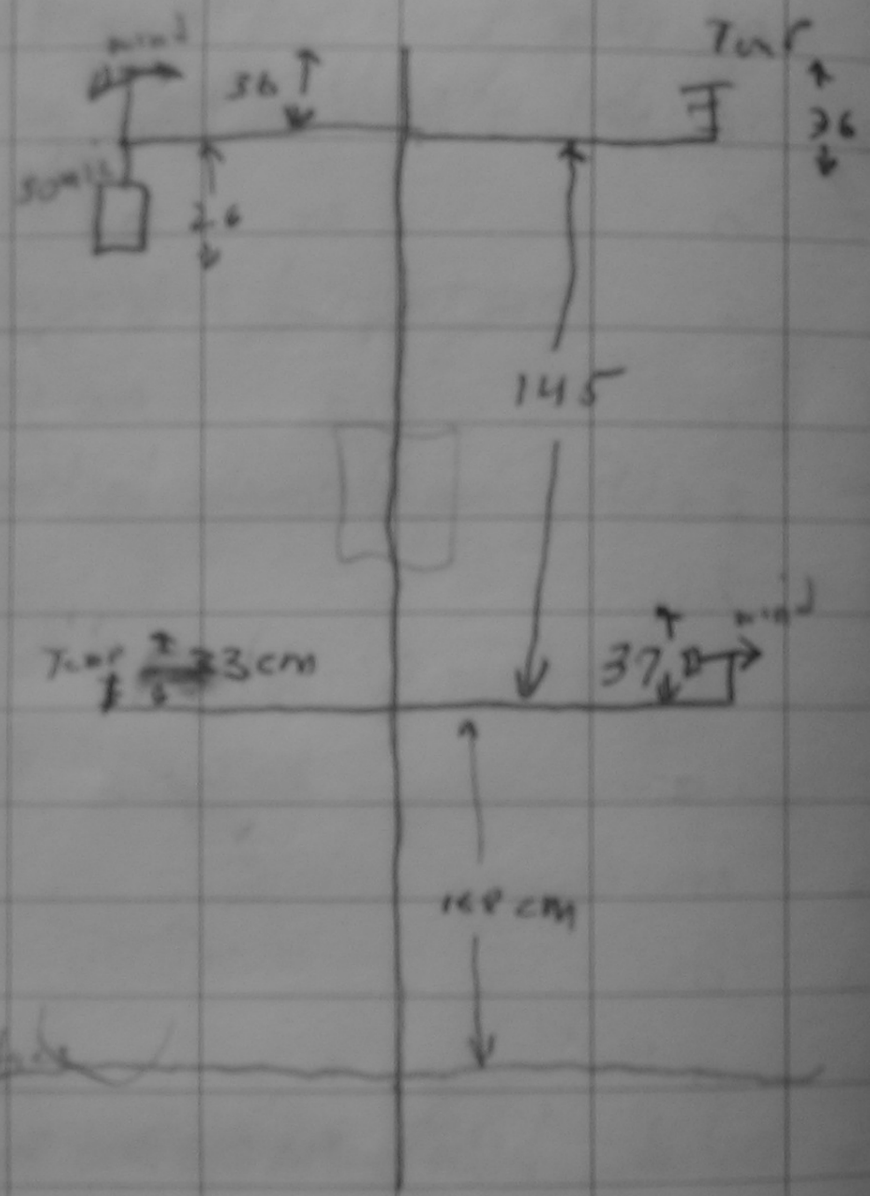
datalogger 10:47:18

- had 15 hour and 18 sec delay
- set datalogger clock at 1026 GMT

Note: had problems with clock. downloaded program + sent back

- first average will be 2200 JD147
- will be a [illegible] from this point for a problem
- see heights above → 2 pages

5/26/04 Jar 2 completed station



Only 1 sonic

used 40° declination to set Radiometer orientation. Tower is leaning ~1° west

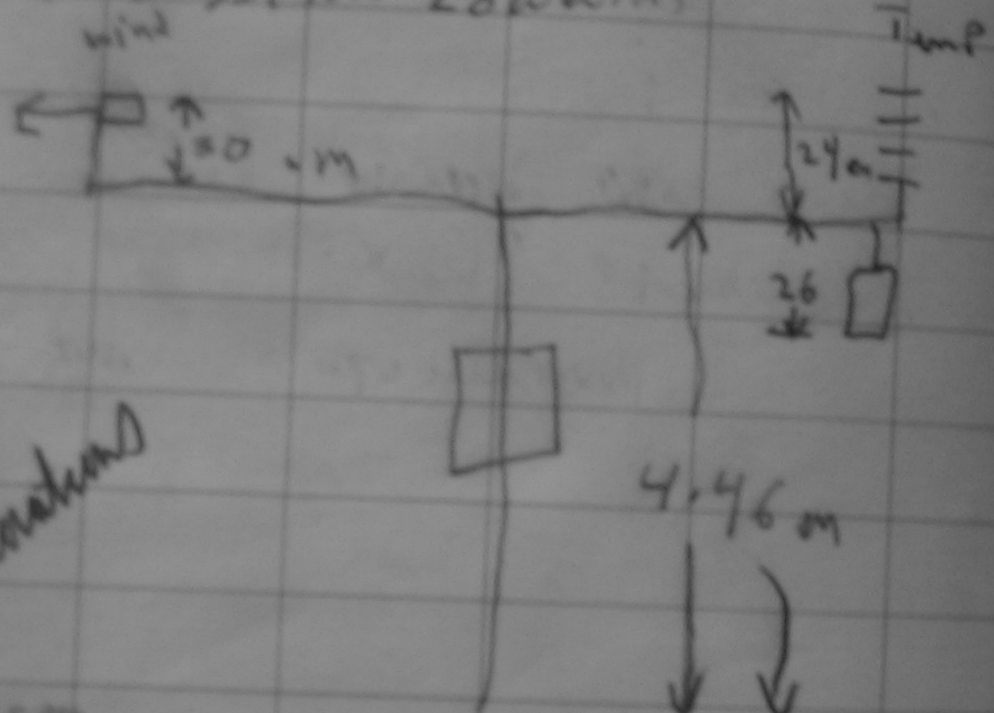
Replaced Hmp1 wind 1+2 + Sonic

GPS Solar panels are at 10° magnetic from the Tower at 20 m distance

May 27, 2004 : SMS (3)

Heights total: Arm 1 above surface

Heights Before Lowering



209 After Lowering

Input Locations

Input no.	Item
1	Thermocouple
2	HMP Temp
3	HMP hum
4	W. Speed
5	W. Dir
6	Sonic
7	Battery

8 - panel

Tower is 6.6 m into ice

Rotated wind sensor box to south using 40° magnetic declination

(1) 6.6 m into ice
(2) Changed sonic - working
(3) Thermocouple (Input 1) not working, tested with new and still not working: appears to be programming issue

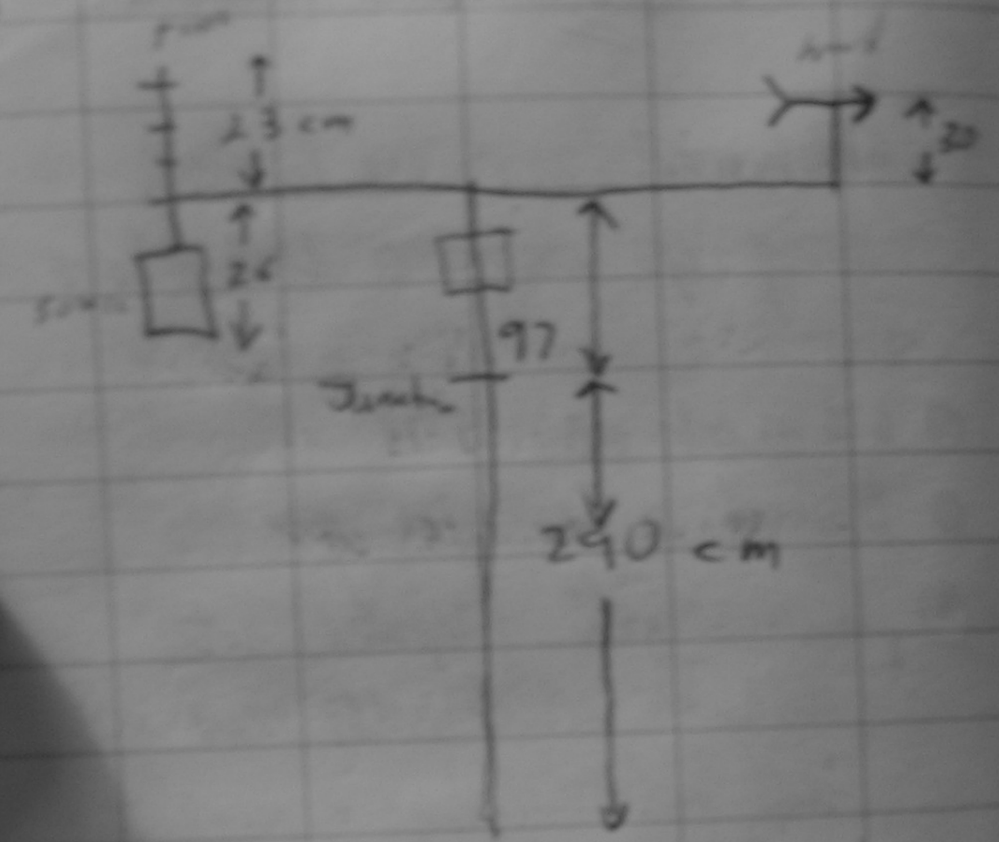
Heights after mast + lowering

Arm 210 cm at mast
Trh1 234 cm
Wind (1) 240 cm
Junction 90 cm

- all above ice

Note: Need waypoint of GPS.

[illegible] 5/27 SMART 5



May 27, 2004

- Smart Globe 5 over boat ice with water pooling around the ice
- took heights, took off battery and dismantled tower at 1300 UTC
- clock SMS-5 12:50:00 PC
  12:28:30 datalogger
  datalogger 21 minutes 30 seconds slow

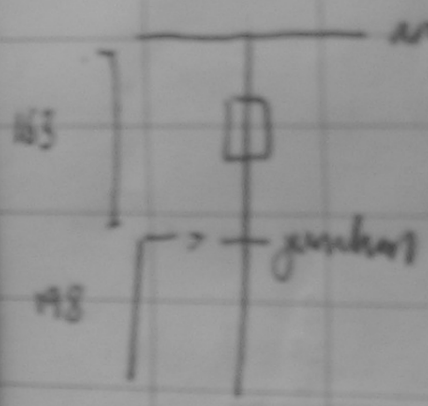
May 27, 2004 : 1500 UTC SMS ②

Sensor heights:

Junction: 198 cm from ice

Snow depth 7–10 cm

Junction to deck: 165 cm



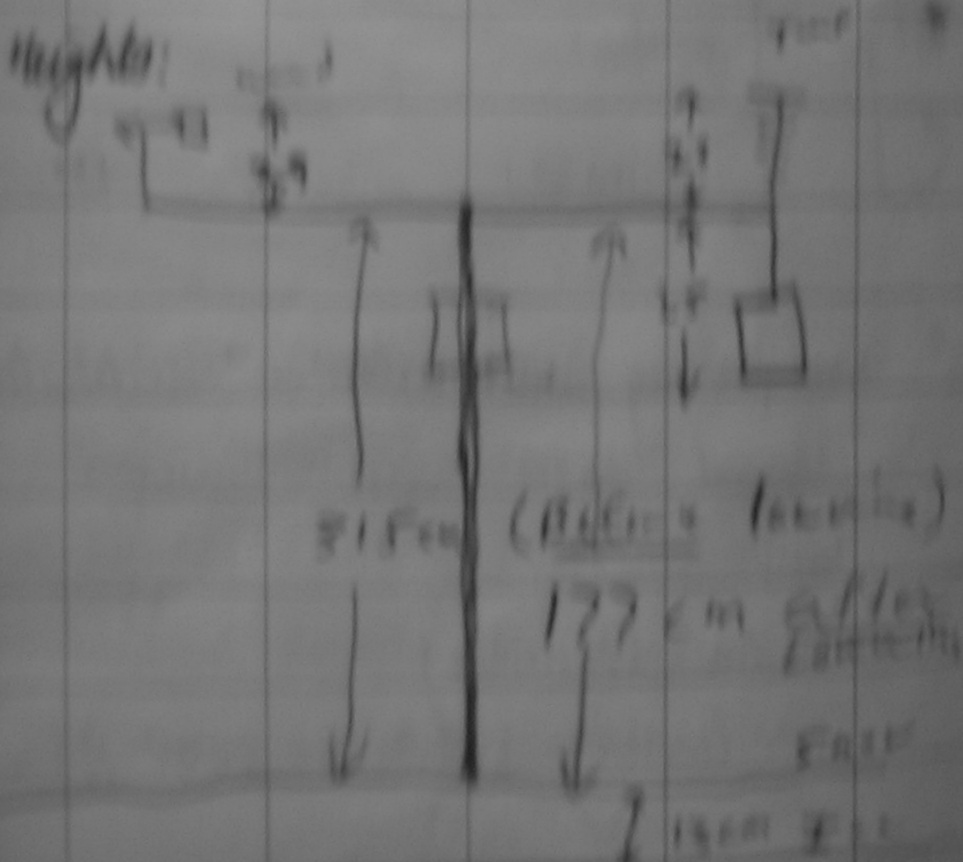
- wind parking south with 40° declination
- changed SK50, used as Command from SMS5
- all channels working
- tower bearing 5[illegible]° to 300° N (mag)

Heights after leaning : SMS(2)

Comp 167 cm
T/RH 191 cm ~24 cm about down
Wind 197 cm ~30 cm about down
Snow 133 cm
Total mast about 40 : 2.4 m

SMS(1) May 27, 2009

Heights:



changed clock time at 10:18 AM 38 PST,
datalogger (? minutes 18 seconds) slow
changed orientation of wind to
after leaning tower
all instrument(s) working

Note: need to check SMS programs, they don't all appear to be the same

Wind orientation: used 40° declination

tower is leaning 7.8° to 283° N

Sat ① May 30, 2004

- Laser bearing 10° to west (296°) using 40° mag. variant headings

Arm ① 381 cm (from ctr)
- snow depth 98 cm at arm
- had range of snow depths based on variant topography 87-98 cm

After lowering

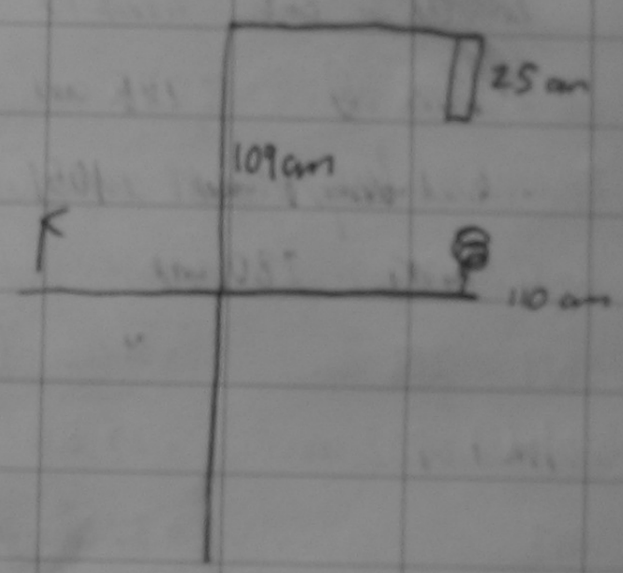
Arm ① 200 cm (from ctr)

Heights above snow

Arm ① = 110 cm Arm ② 230 cm
RH/T ③ = 155 cm +45
Wind ① = 156 cm +46
RH/T ② 275 cm +45

- had 120 cm separation between arms
- had changed 2 servos

- 109 cm above arm ① and 25 cm below arm ①



- had about 1 m of snow at site with 50-90 cm elevation
- all instruments working, did not ground calc multiplexer
- had snow density at back of boots
- Note: drilled mast into 3 m of ice

June 2, 2004 Swiss Ramps tower

tower was rebuilt after falling over in 2003

Heights after new mast

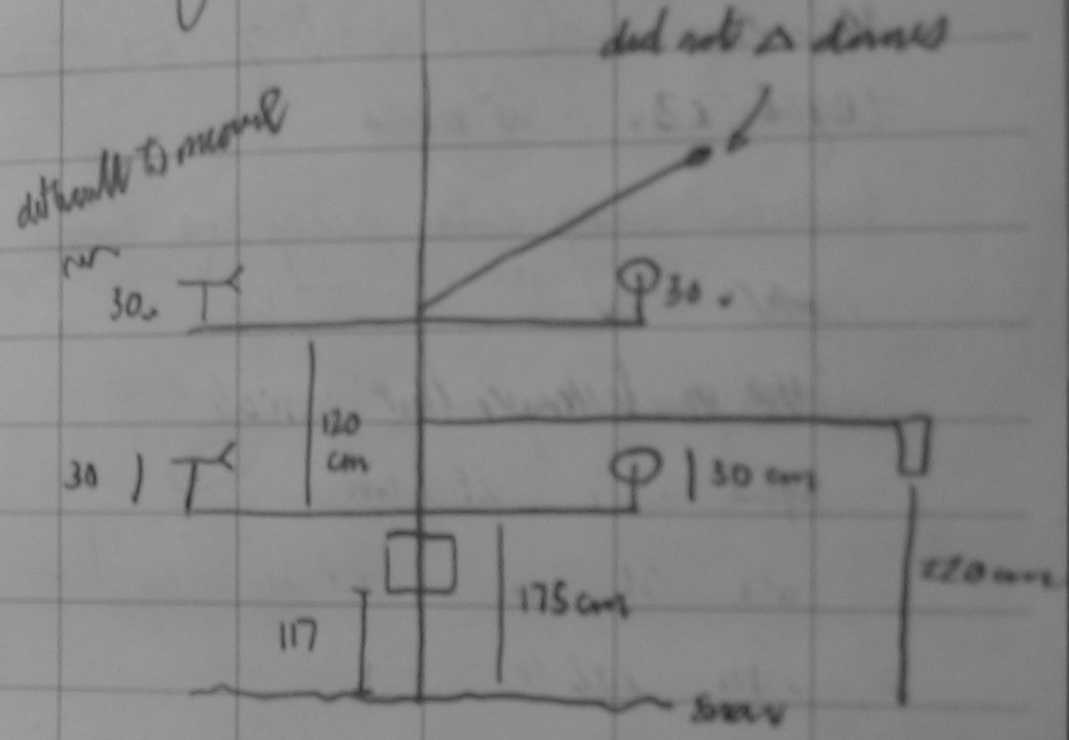
lower arm @ 175 cm
horizontal between arms 105 cm
upper arm 280 cm

W1	206 cm	+31 cm	(above arm)
t/rh 1	202 cm	+27 cm	"
W2		+32 cm	"
t/rh 2		+27 cm	"
sonic 1	(arm height) =	296 cm	-26
sonic 2	(arm height) =	299 cm	-26

Pickle arm orientation 20° N
R* south using 40° mag declination

June 10, 2004 Control trial 1658 UTC

distance heights:



- time accurate
- problems with panel temps - thermocouples
- all other instruments working
- 1 sonic instrument
- need new instrument (sonic) only have 1
- some instruments

June 2, 2004 Swiss Camp tower

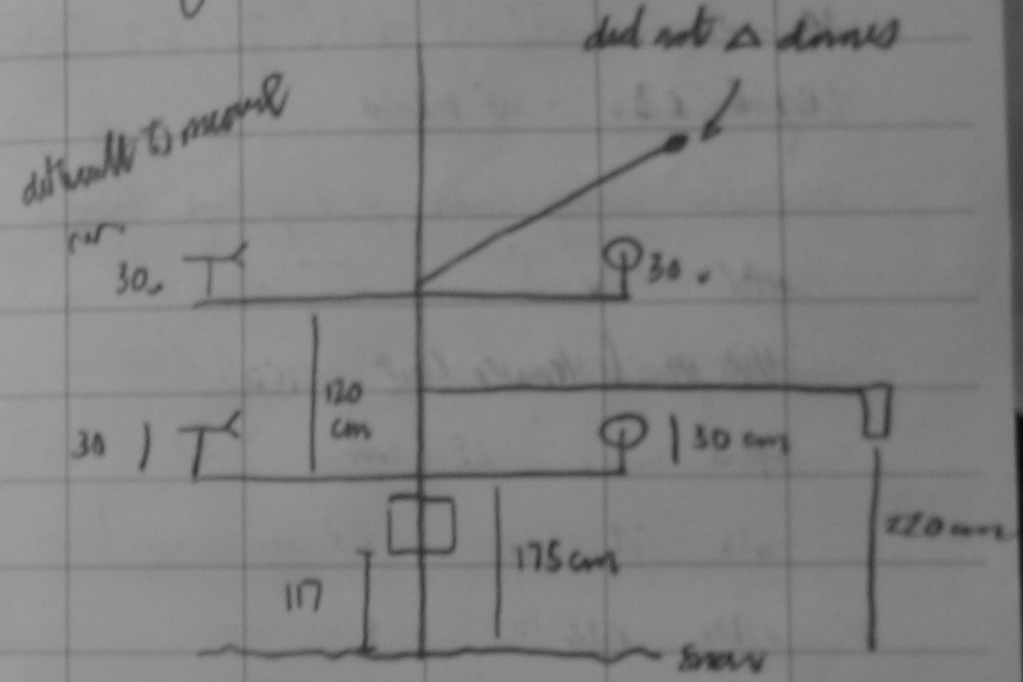
tower was rebuilt after falling over in 2003
Heights after new mast

tower arm @	175 cm		
sustained between arms	105 cm		
upper arm	280 cm		
WS1	206 cm	+31 cm	(above arm)
T/RH 1	202 cm	+27 cm	"
WS2		+32 cm	"
T/RH 2		+27 cm	"
sonic 1	(arm height) =	296 cm	-26
sonic 2	(arm height) =	299 cm	-26

- Pickle arm oriented at 20° N
- 8th south wing 40° mag declination

June 10, 2004 Gaylord Bird 1658 UTC

Sensor heights:



- time accurate
- problems with panel temps - thermocouples
- all other instruments working
- 1 sonic instrument
- need new instrument (sonic), only have 1
- some instruments used out of box

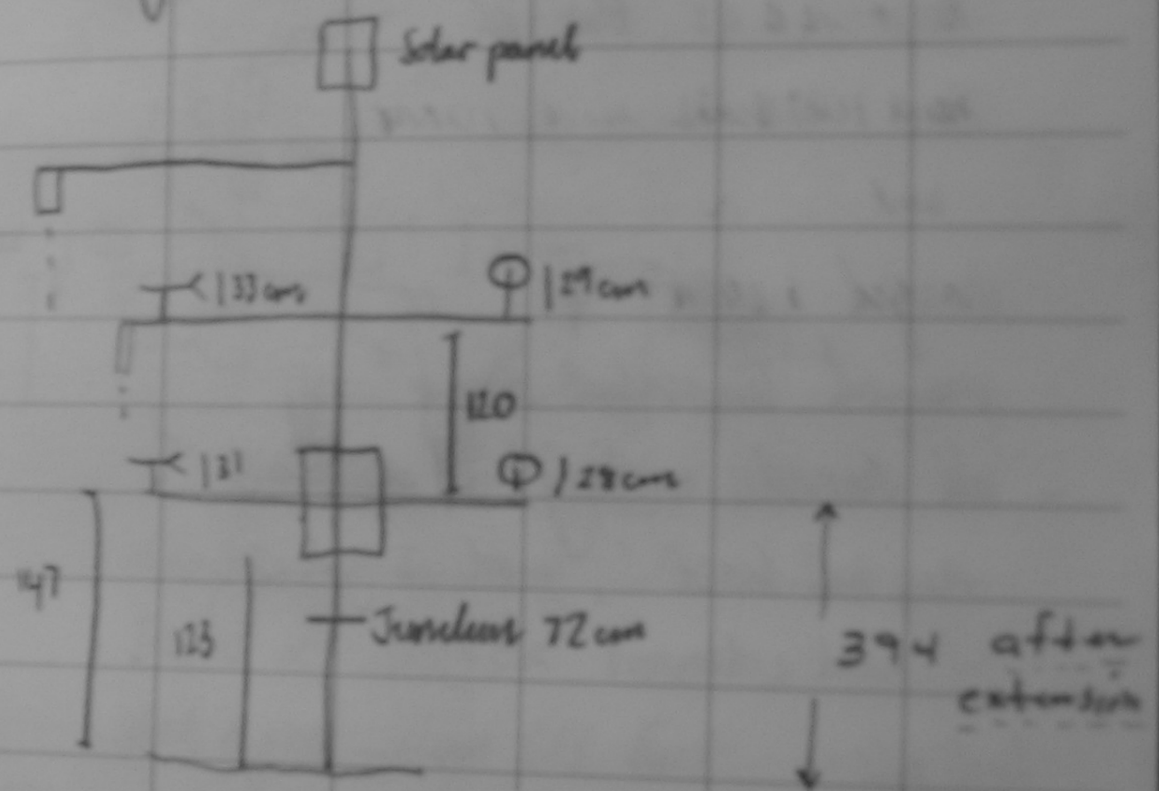
Problems: Crashed twice

- Final temp was 44°C
- had measurements of about 7.1 + 6.9 for tc1 + tc2
- thermistor string data perhaps a little high
- is the panel temperature correct?

June 11, 2004 : Nasa SE

Arrival : 400 GMT - Clear skies, warm 6°C

Heights:



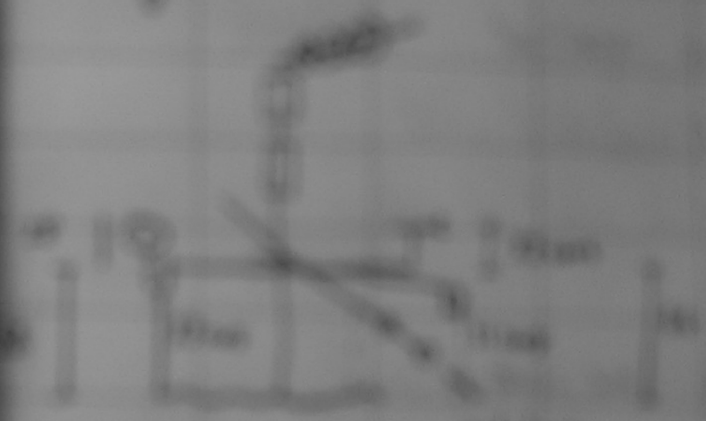
Time: Time is exact. 12 02:24 GMT

Equipment: All working except wind speed 1

RM ② too high, otherwise good

Data: 287247

: wind laptop crashed



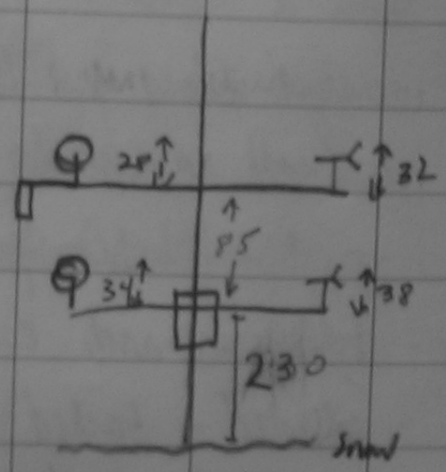
- put new power cable on, 10m on each line: (1) datalogger and (2) transmitter - datalogger didn't like program.

- replaced wind propellar
- some vibrations but still good
- have some weak areas on cable

- dug snow pit: see back of book

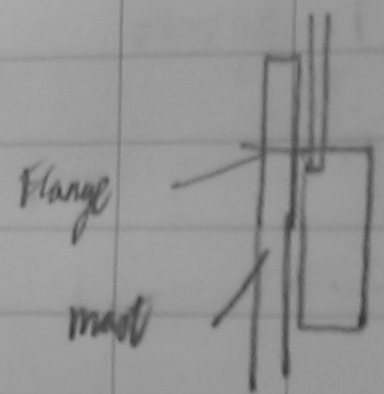
- will need to replace tie string at next extension
- needs to be extended in 2005 —

Heights after:



Other comments:

(1) Enclosure not attached at bottom. could attend bar or attach to mast



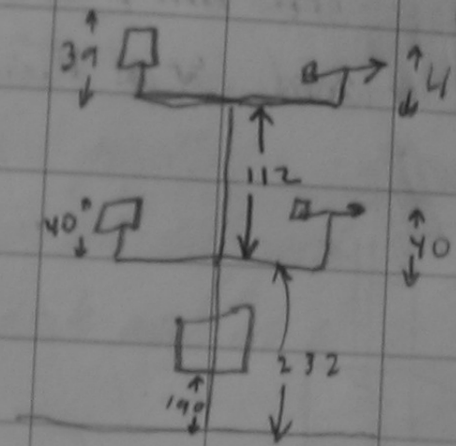
(2) Will require extension in 2005 —> (3) Need new tie string

(4) Replaced sonic 1, both sonics working

Dyl 7: Dec 6/12 km

Arrive: 10:43 local

All sensors and Sonic #2 are functional



Oct 3: 302/12

- use storage module to download
- replaced sonic
- dug snow pit - see back of book
- all instruments working

Note: clock 17 minutes slow, CF5 not powered (5V)

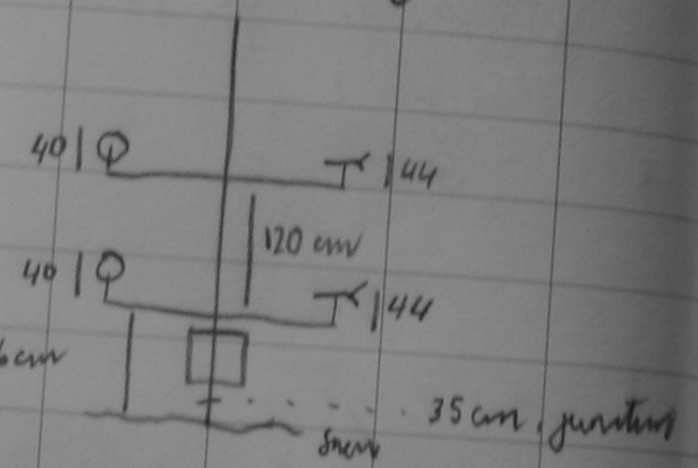
- Set clock + gain FPS 5V.
- time 1400 UTC

Total Command: Dyl 2

- will need to string next time
- have power cables for next extension
- extension in 2006 (or 2005 if big snow year)

June 14, 2014

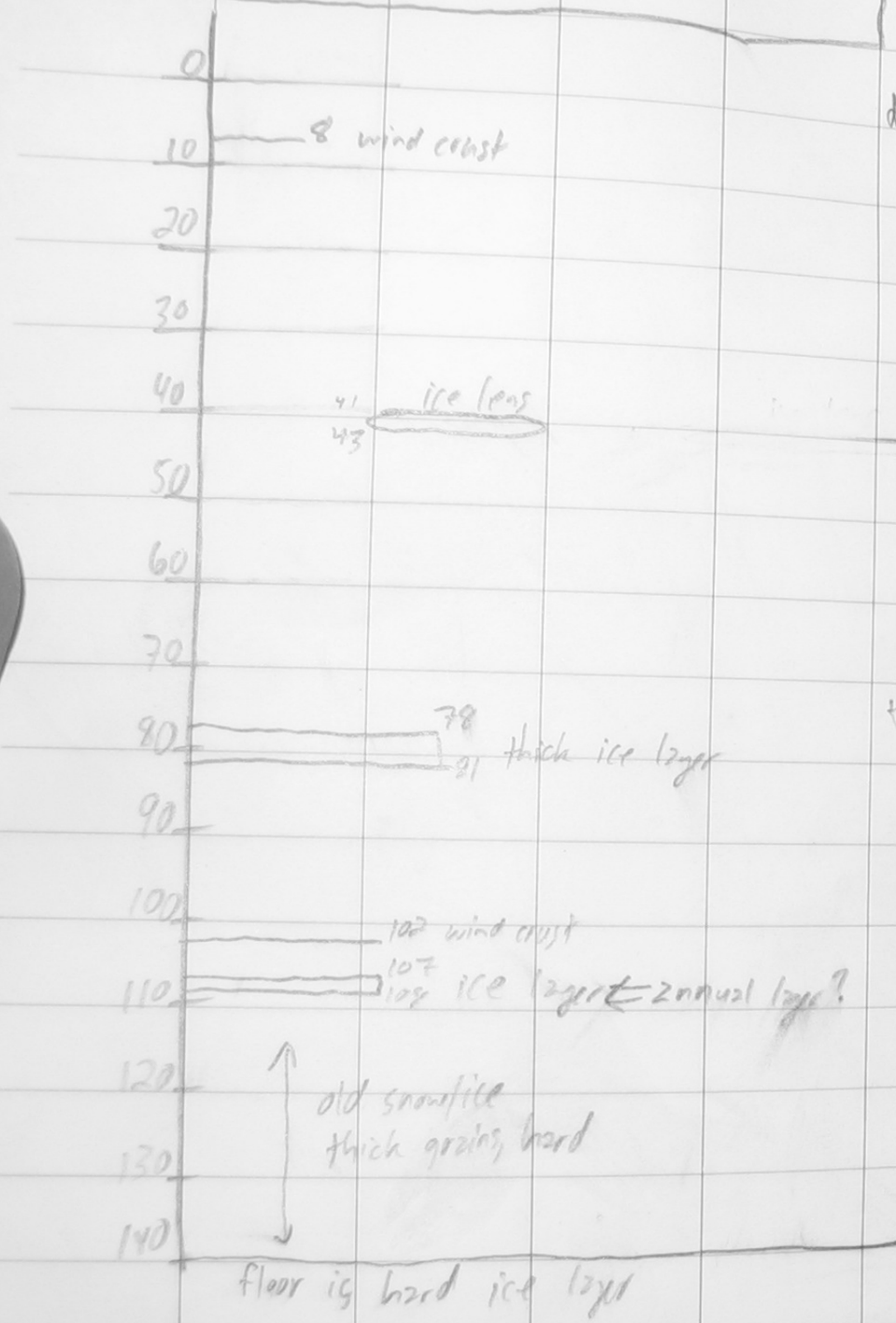
Summit: Arrival 1237 GMT
Clock: GPS time working
Heights:



- haul NR Lite
- sonic height
- junction of tower at enclosure
- tower will be slightly buried - enclosure, but all instruments will remain above the surface
- haul power cable + temp string for 2005 extension

- wind ① has damaged tail
- sonic 2 needs replacing
- collected 95% of data

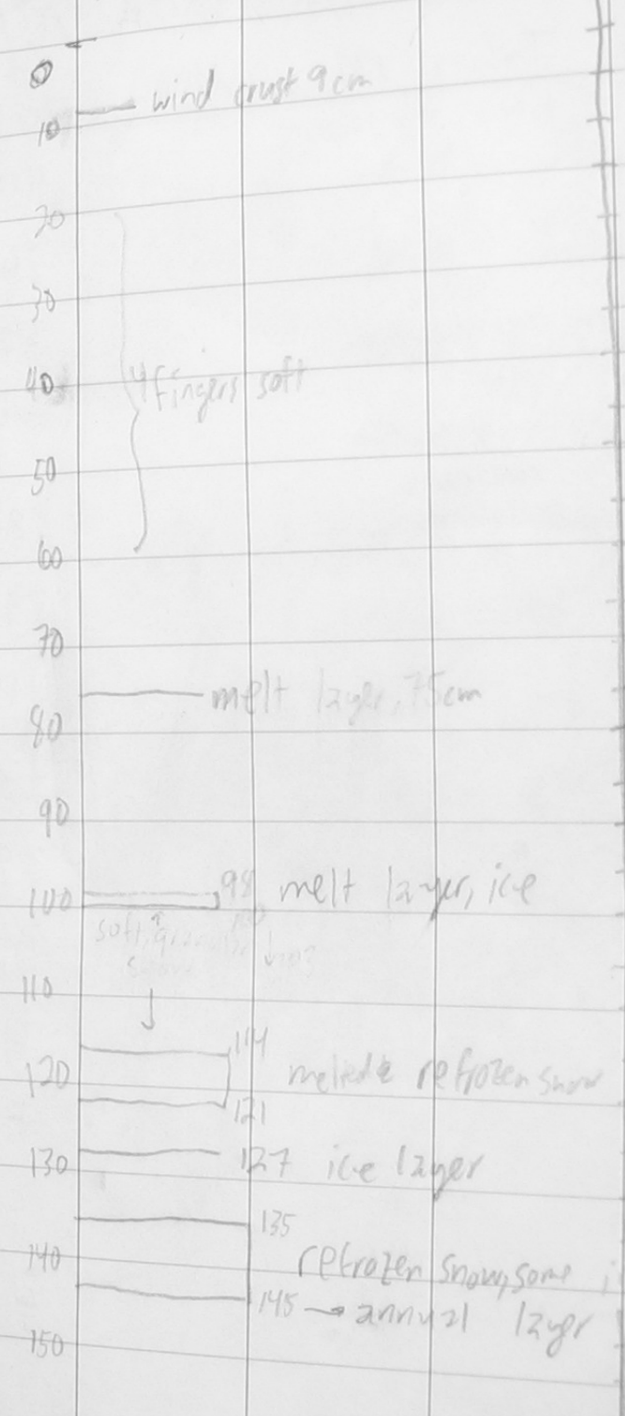
Dye-2, snow pit by John Maurer — Saturday, June 12, 2004, 13:31 UTC



density
331
349
377
386
403
389
356
too hard
392
376
too hard

Saddle AWS, Friday, June 11, 2004, 21:06 UTC

Russ & John & Nik's snow pit



temp.	density
-3 °C	390?
-4	394
-5	347
-5.5	377
-6	407
-7	414
-7.5	400
-8	370
-9	405
-9	413
-10	395
-10	337
-10	343
-13	398

Dye-2, Saturday, June 12, 2004, 13:31 UTC
snow pit by John Maurer

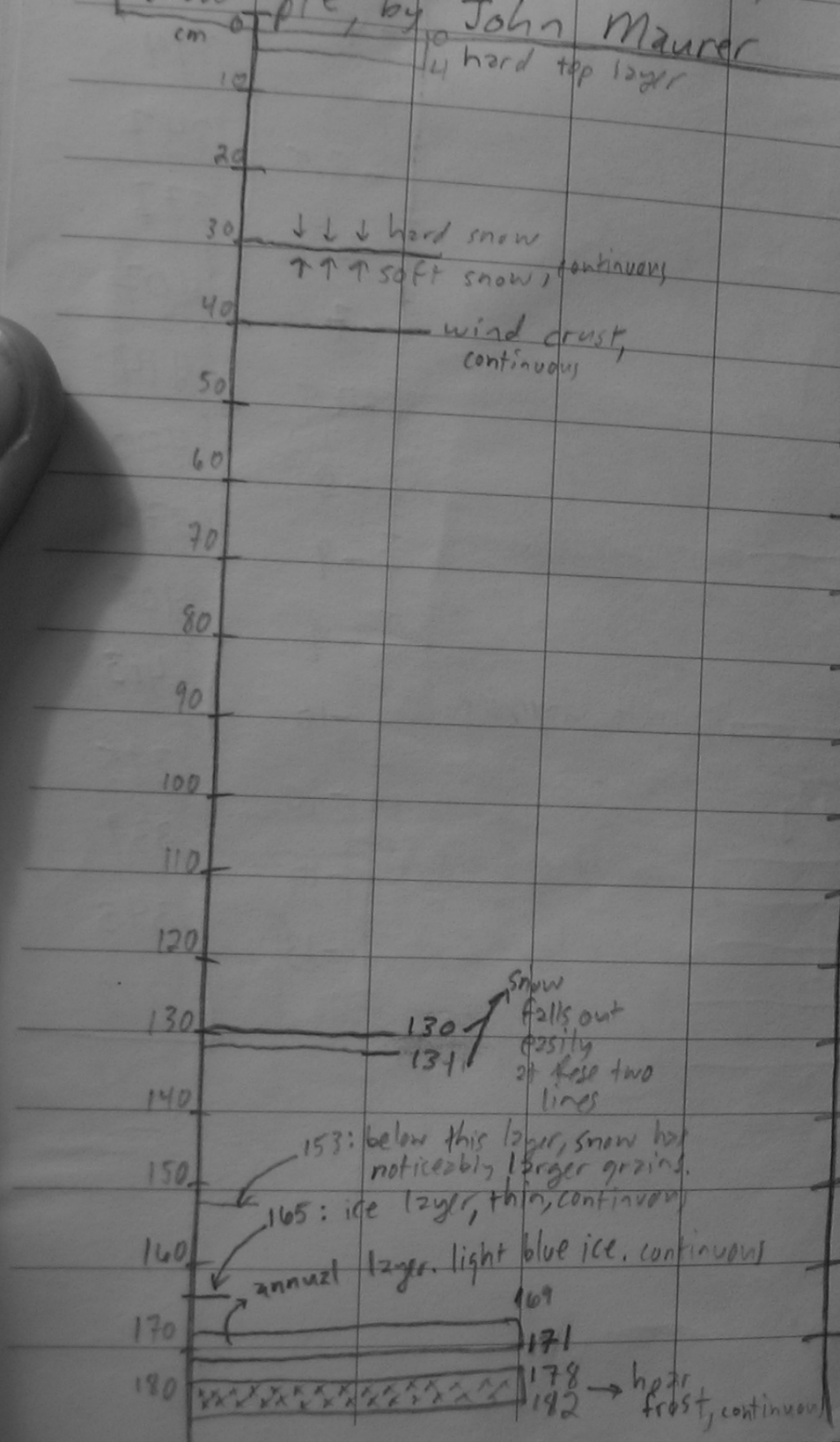
		density
0		
10	8 wind crust	331
20		349
30		377
40	41 ice lens 43	386
50		403
60		389
70		356
80	78 thick ice layer 81	too hard
90		392
100		376
110	102 wind crust; 107 ice layer ← annual layer?	
120	old snowfire thick grains, hard	too hard
130		
140	floor is hard ice layer	

saddle AWS, Friday, June 11, 2004, 21:06 UTC
Russ & John & Nik's snow pi

		Temp.	density
0		-3 °C	390?
10	wind crust 9cm	-4	394
20		-5	
30		-5.5	347
40	4 fingers soft	-6	377
50		-7	407
60		-7.5	414
70		-8	400
80	melt layer, 7.5cm	-9	370
90		-9	405
100	99 melt layer, ice	-10	413
110	soft grains		
120	114 melted refrozen snow 121	-10	395
130	127 ice layer	-10	339
140	135 refrozen snow, some ice 145 → annual layer	-13	343
150			398

NASA-SE, Friday, June 11, 2004, 13:12 UTC

snow pit, by John Maurer



cm	density
0	402
10	364
20	376
30	344
40	382
50	396
60	414
70	437
80	398
90	423
100	418
110	419
120	404
130	424
140	426
150	393
160	426
170	389

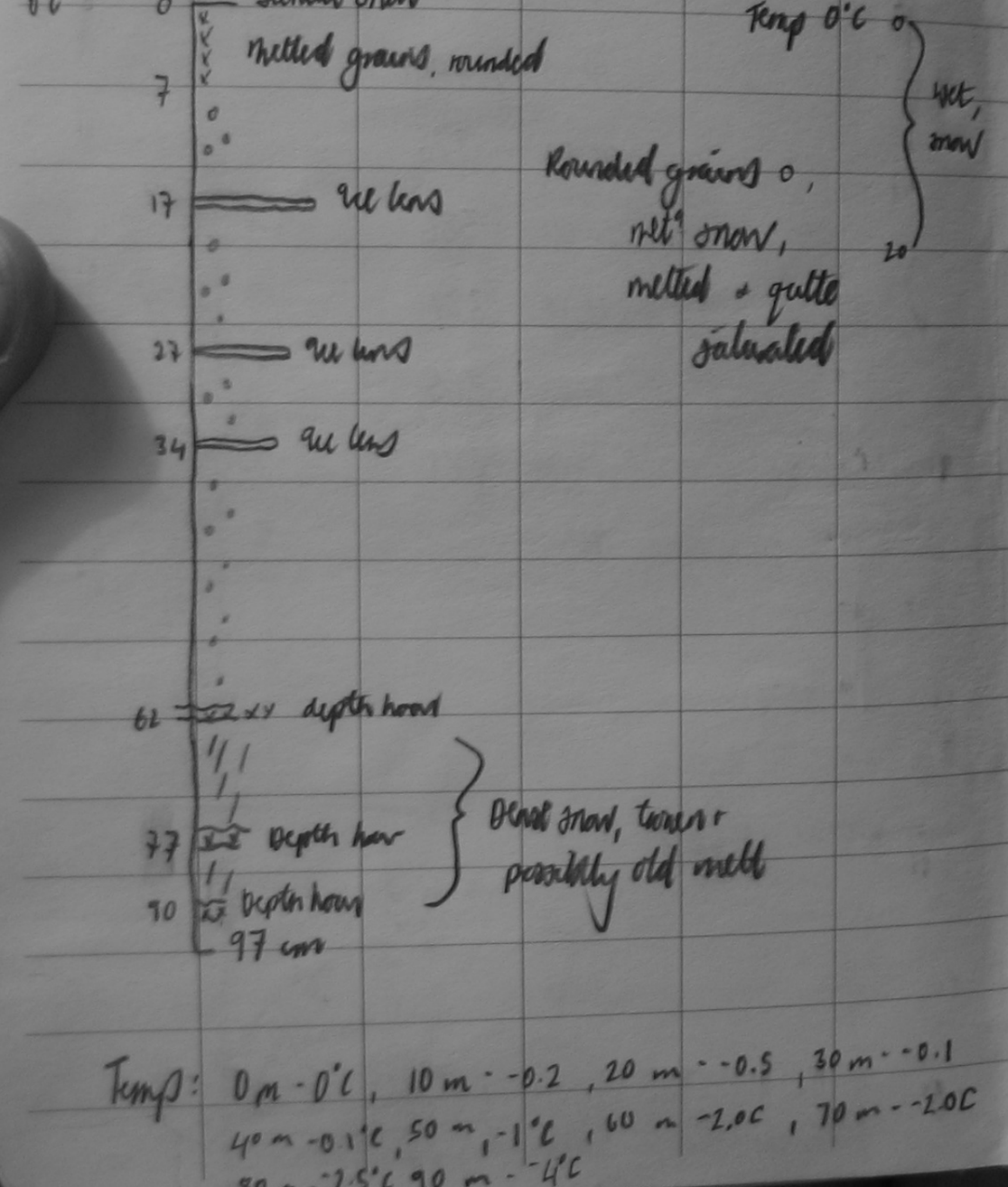
Jar ① 2004 Snow density

0-10	595
10-10	525
20-30	495
30-40	400
40-50	376
50-60	386
60-70	387
70-80	365
80-90	381
90+	

JAR ① : Snowpit 2004

May 30, 2004 1700 UTC

- clear skies, wind
- depth to ice 97 cm



Temp: 0m - 0°C, 10m - -0.2, 20m - -0.5, 30m - -0.1
40m - -0.1°C, 50m - -1°C, 60m - -2.0C, 70m - -2.0C
80m - -2.5°C 90m - -4°C

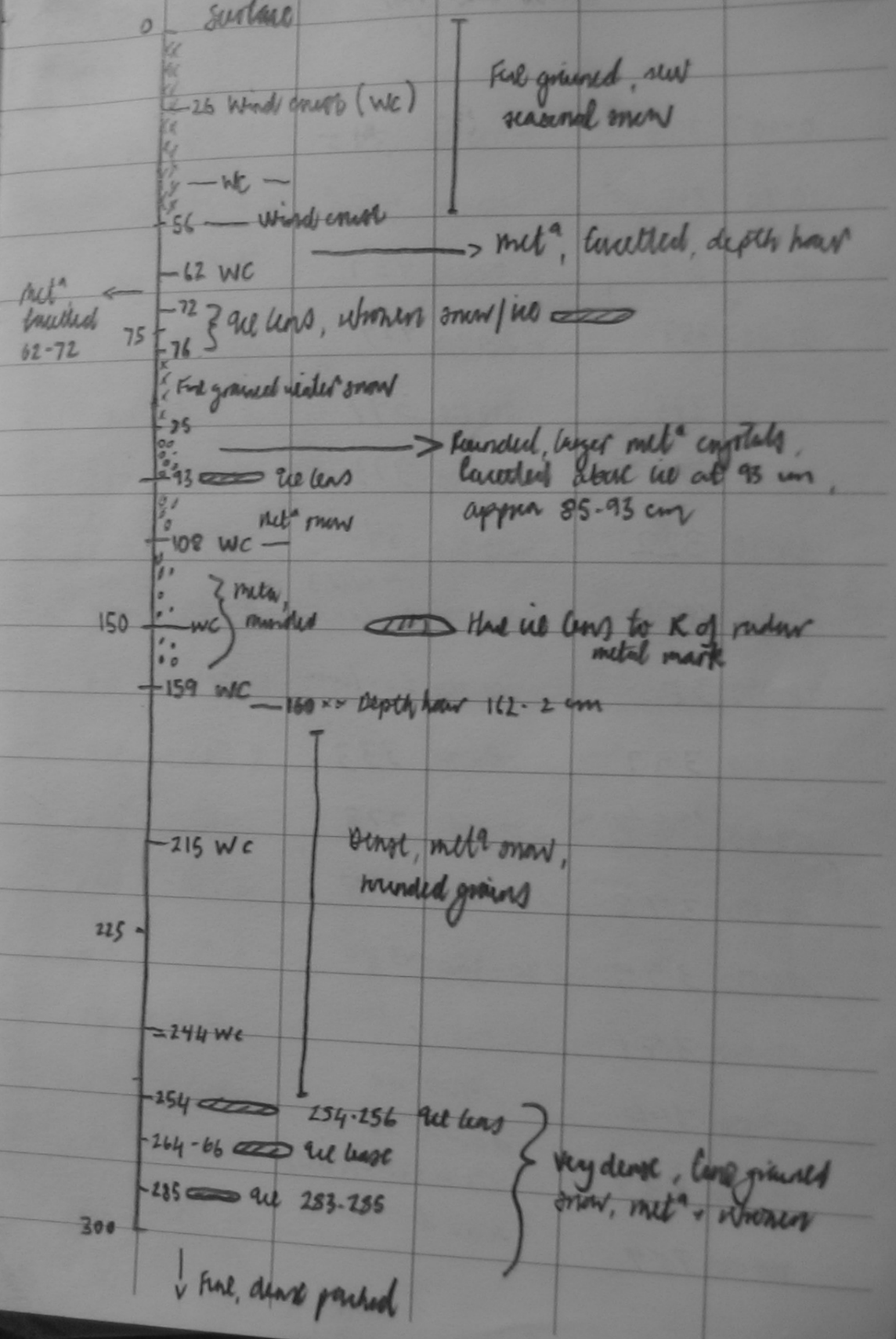
AWS GOES request

1 of
2 SL
3 SI
4 Q°
5-14 tc1-10
15-16 tc 1-2
17-18 temp 1-2
19 rh1
20 rh2
21 u1
22 u2
23-24 wd 1+2
25 pres1
26 snow 1
27 snow 2
28 batt
29 xmit power

Notes: Related to this pit

① Top of metal marks for radar
- ⓐ 62 cm
- ⓑ 93 cm
- ⓒ 150 cm

Notes E: Snow stratigraphy June 2 2003



Nasa U : Snow density June 2 2003

0-10	307	170-180	385
10-20	315	180-190	403
20-30	341	190-200	427
30-40	357	200-210	434
40-50	373	210-220	391
50-60	318	220-230	373
60-70	322	230-240	340
70-80	404	240-250	~443 Ice Lense
80-90	388	250-260	Ice lense
90-100	397	260-270	333
100-110	Ice Layer	270-280	378
110-120	398	280-290	408
120-130	399	240-300	~386
130-140	381	↓	
140-150	400	400+ on	
150-160	333	down - Very Dense - Knife hard	
160-170	359		

Nasa U : Snow temperature

(cm) 0	-5.7	170	-17.7
10	-8.4	180	-18.8
20	-9.5	190	-18.8
30	-11.2	200	-17.2
40	-11.2	210	-17.2
50	-12.3	220	-18.4
60	-13.0	230	-19.1
70	-13.3	240	-19.5
80	-14.0	250	-18.7
90	-15.9	260	-19.0
100	-16.5	270	-19.4
110	-16.8	280	-20.0
120	-17.5	290	-20.0
130	-17.2	300	-20.4
140	-17.0		
150	-16.9		
160	-16.6		

Nhon E : Snow pit 30/5

0 – Soft new snow
10 –
Fine grained
31 – ~ wind crust
= } wind crusts
46 – Depth hoar
50 –
Rounded melt crystals, old wind crusts
64 – ice lens, 4 cm, distinctive melt layer
70 –

annual layer or ↓ here

here appears 50-60 accumulation

→ multiple ice lenses in this region

= series of small crusts

100 ~ wind crust
110 – soft layer, faceted
130 – Faceted crystals → rounded
135 –
Hard, with wind crusts
150 –

Nhon E : Snow density 5/30/03

0-10	340	↓ Winter snow	70-80	294
10-20	380		80-90	309
20-30	354		90-100	313
30-40	308		100-110	349
40-50	235	depth hoar	110-120	325
50-60	422	ice	120-130	361
60-70	388		130-140	375
			140-150	402

Snow Density - Humboldt

10cm	361 g
20cm	329
30	274
40	318
50	440
60	394
70	328
80	335
90	378
100	362
110	362
120	359
130	387
140	310
150	353
160	316
170	380
180	364
190	392
200	374

5/22/13 Humboldt Pit Russ Huff

5cm	4cm thick hard wind crust
9cm	soft snow
14cm	
17cm	3cm hard wind crust
	very soft snow
33cm	
	knife Hard wind Layer - 5cm
38cm	
40cm	Refrozen melt snow
47cm	.2cm Ice lense
72cm	Hoar from 47-72cm
73cm	wind Layer - 1cm
106cm	Homogenous Large Round crystal
	density changes - much thicker
118cm	wind crust
152	Homogenous hoar
	Increasing hardness to 2m

Snow Density - Humboldt

10 cm	361 g
20 cm	329
30	274
40	318
50	440
60	394
70	328
80	335
90	358
100	362
110	362
120	359
130	387
140	310
150	353
160	316
170	380
180	364
190	392
200	374

5/22/13 Humboldt Pit Russ Hufe

5 cm — 4 cm thick hard wind crust

9 cm — soft snow

14 cm

17 cm — 3 cm hard wind crust

very soft snow

33 cm

knife hard wind layer - 5 cm

38 cm

40 cm — Refrozen melt snow

47 cm — .2 cm Ice lense

72 cm — Hour from 47-72 cm

73 cm — wind Layer - 1 cm

106 cm — Homogenous large Rounded crystal density changes - much thicker

118 cm — wind crust

152 — Homogenous hoar

Increasing hardness to 2m

Wind Wiring

red P1 - P2

green H 4 L

Blue E2

Black + White + Shield AG

②KT & 3V - 3V

- snow at northern stake about 5 cm
- 192 cm from snow to stake top (height
- 141 cm from snow to marker
- appox 146 cm melt

- snow at southern stake 27cm
- 157cm from snow to top of stake (height)
- 122 cm from snow to marker
- appox 149 cm of total melt.

Measurement : May 9 2003

① KTK 3E

- northern stake has 13 cm of snow
- stake height = 202 cm
- snow to marker = 148 cm
- have approx 161 cm of surface ice, including snow

- southern stake has 42 cm of snow
- stake height from snow surface = 179 cm
- snow to marker = 123 cm
- have approx 165 cm of surface ice

note: have drifted snow at southern stake, on lee of ice ridge